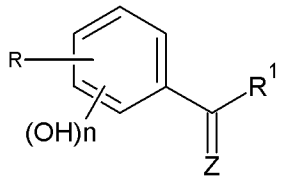
CLAIMS (Clean Copy)

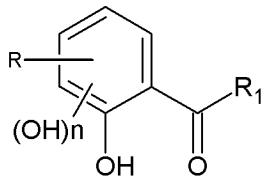
[Claim 1] (Currently Amended). A Matrix Metalloprotease, MMP, Inhibitor consisting of at least one hydroxyaryl compound that contains an alkyl carbon side chain with a ketone group attached at the first carbon atom of the alkyl side chain, and said ketone group is directly attached to the aromatic ring at a position adjacent to hydroxyl group of hydroxyaryl ring, the chemical structure of which is in accordance to formula (I):



(I)

Wherein:
Z is O ;
(OH)n is one, two, or three OH substituents, one of which is 2-hydroxy;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl; and
R1 is selected from the group consisting of Methyl, Ethyl, Alkyl, and Aryl.

[Claim 2] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound is selected from the group consisting of hydroxy acetophenones, and hydroxy propiophenones, the chemical structure of which is in accordance to formula (II):



(II)

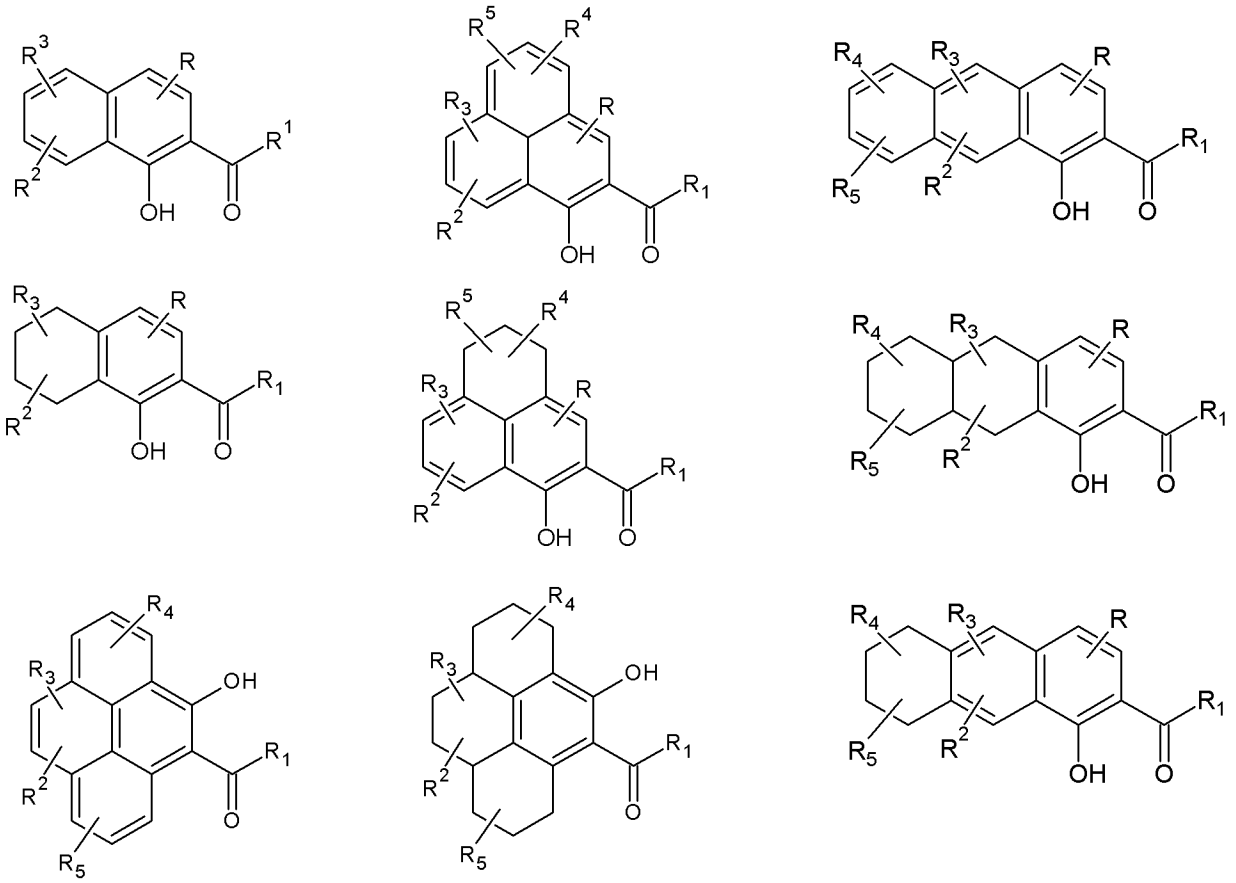
Wherein:
(OH)n is one or two OH substituents;
R1 is Methyl or Ethyl;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl.

[Claim 3] (Canceled). A composition according to claim 1, wherein-hetero-aromatic compound is selected from 2-acetyl-substituted N-hetero-aromatic compounds.

[Claim 4] (Canceled). A composition according to claim 1, wherein hydroxyaryl compound is selected from oxime, or hydrazide, or semicarbazone, or oxamic hydrazone derivatives of hydroxyaryl- or polyhydroxyaryl alkyl ketones.

[Claim 5] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound is selected from oxime, or hydrazide, or semicarbazone, or oxamic hydrazone derivatives of N-hetero-aromatic alkyl ketones.

[Claim 6] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound contains additional cyclic rings attached at the aromatic ring, the chemical structure of which is in accordance to formula (III):



(III)

Wherein:

R1 is Methyl or Ethyl;

R2, R3, R4, and R5 are each independently selected from the group consisting of H, OH, Methyl, Alkyl, Cyclo-Alkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl.

[Claim 7] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound contains additional cyclic rings attached at the nitrogen hetero-aromatic ring.

[Claim 8] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound contains additional hetero-atoms in same ring that contains nitrogen hetero-atom; or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring.

[Claim 9] (Canceled). A composition according to claim 1, wherein the cosmetically or pharmaceutically acceptable delivery system can be traditional water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, or anhydrous compositions.

[Claim 10] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxy acetophenone compound is selected from the group consisting of 2-hydroxyacetophenone, 3-hydroxyacetophenone, 4-hydroxyacetophenone, 2,3-dihydroxyacetophenone, 2,5-dihydroxyacetophenone, 2,6-dihydroxyacetophenone, 3,4-dihydroxyacetophenone, 3,5-dihydroxyacetophenone, 2,4,6-trihydroxyacetophenone, 2,3,4-trihydroxyacetophenone, 2,3,5-trihydroxyacetophenone, 2,3,6-trihydroxyacetophenone, 2,4,5-trihydroxyacetophenone, 3,4,5-trihydroxyacetophenone, Resacetophenone, 2-Acetyl resorcinol, 4-Acetyl resorcinol, 3,4-Dihydroxyacetophenone, acetyl quinol, Quinacetophenone, 1-(3-Hydroxy-4-methoxy-5-methylphenyl) ethanone, 1-(3-hydroxy-4-methoxyphenyl) ethanone, Paeonol, Phloridzin, 5'-Bromo-2'-hydroxyacetophenone, 5'-Chloro-2'-hydroxyacetophenone, 3',5'-Dichloro-2'-hydroxyacetophenone, 3',5'-Dibromo-4'-hydroxyacetophenone, and 5-Chloro-3-bromo-2-hydroxyacetophenone.

[Claim 11] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxy propiophenone compound is selected from the group consisting of 2-hydroxypropiophenone, 3-

hydroxypropiophenone, 4-hydroxypropiophenone, 2,3-dihydroxypropiophenone, 2,4-dihydroxypropiophenone, 2,5-dihydroxypropiophenone, 2,6-dihydroxypropiophenone, 3,4-dihydroxypropiophenone, 3,5-dihydroxypropiophenone, 2,4,6-trihydroxypropiophenone, 2,3,4-trihydroxypropiophenone, 2,3,5-trihydroxypropiophenone, 2,3,6-trihydroxypropiophenone, 2,4,5-trihydroxypropiophenone, 3,4,5-trihydroxypropiophenone, 1-(2,4-dihydroxyphenyl)-2-hydroxyethanone, (2-hydroxyphenyl)(oxo)acetic acid, 1-(2,6-dihydroxyphenyl)-1-butanone, 1-(1-hydroxy-2-naphthyl)ethanone, 1-(2-hydroxy-1-naphthyl)ethanone, 5,7-dihydroxy-1-indanone, 1-(2-hydroxy-5-methylphenyl)-1,3-butanedione, N-(4-acetyl-3-hydroxyphenyl)acetamide, 4-acetyl-3-hydroxyphenyl acetate, Phloridzin, 1,1′-(4,6-Dihydroxy-1,3-phenylene)bisethanone, 1-(1-hydroxy-2-naphthyl)ethanone, and 2,3-Dihydro-9,10-dihydroxy-1,4-anthracenedione.

[Claim 12] (Canceled). A composition according to claim 2, wherein oxime, or oxime O-alkyl ether, or hydrazone, or semicarbazone, or oxamic hydrazone derivatives of hydroxy or polyhydroxy acetophenones, or hydroxy or polyhydroxy propiophenones, or combinations thereof, are selected.

[Claim 13] (Canceled). A composition according to claim 2, wherein oxime, or oxime O-alkyl ether, or hydrazone, or semicarbazone, or oxamic hydrazone derivatives of 2-acetyl-N-heteroaromatic, or 2-propionyl-N-heteroaromatic compounds, or combinations thereof, are selected.

[Claim 14] (Canceled). A composition according to claim 3, wherein N-hetero-aromatic compound is selected from 2-acetylpyridine, 2-Acetyl-4-methylpyridine, 1-(1-oxido-2-pyridinyl)ethanone, 2,6-Diacetylpyridine, 3-(Dimethylamino)-1-(2-pyridyl)-2-propen-1-one, 1,8-Diazafluoren-9-one, 2-phenyl-1-(2-pyridinyl)ethanone, 3-phenyl-1-(2-pyridinyl)-2-propen-1-one, 1-(2-pyridinyl)-3-(3-pyridinyl)-2-propen-1-one, 2-hydroxy-1,2-di(2-pyridinyl)ethanone, 1-(2-pyridinyl)-3-(2-thienyl)-2-propen-1-one, 3-(2-hydroxyphenyl)-1-(2-pyridinyl)-2-propen-1-one, 3-(1-oxido-2-pyridinyl)-1-(2-pyridinyl)-2-propen-1-one, 2-acetylpyrrole, 2-Acetyl-1-methylpyrrole, 2-chloro-1-(1H-pyrrol-2-yl)ethanone, 2-(Trifluoroacetyl)pyrrole, 1,4-dihydrocyclopenta[b]indol-3(2H)-one, 2,3,4,9-tetrahydro-1H-carbazol-1-one, (2E)-1,3-di(1H-pyrrol-2-yl)-2-propen-1-one, (2E)-3-phenyl-1-(1H-pyrrol-2-yl)-2-propen-1-one, 2-acetylimidazole, 1-(5-methyl-2-phenyl-1H-imidazol-4-yl)ethanone, 1-(5,6-dimethyl-1H-benzimidazol-2-yl)ethanone, (4-chlorophenyl)(1-methyl-1H-imidazol-2-yl)methanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 1-[1-(4-methylbenzyl)-1H-benzimidazol-2-yl]ethanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(2-fluorophenyl)-2-propen-1-one, (2E)-1-(1H-

benzimidazol-2-yl)-3-(2-chlorophenyl)-2-propen-1-one, (2E)-1-(5-chloro-1H-benzimidazol-2-yl)-3-phenyl-2-propen-1-one, 1-[1-(2-chlorobenzyl)-1H-benzimidazol-2-yl]ethanon, (2E)-1-(5,6-dichloro-1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 2-acetylthiazole, 1-(1,3-benzothiazol-2-yl)ethanone, 2-acetylpyrimidine, 2-acetylindole, 2-acetyl-1-methylpyrrole, 2-acetyl-4-methylpyridine, 1-acetylphenothiazine, 2-hydroxy-1-acetylphenothiazine, 8-hydroxy-9-acetylphenanthrene, 2-acetylpyrazine, 1-(3-methyl-2-pyrazinyl)ethanone, 2-acetylquinoline, 2-acetyl-8-hydroxyquinoline, 2-acetyltryptophane, 2-acetyltryptophanamide, 2-acetylpyridine N-oxide, 2-acetylquinazoline, 2-acetylquinoxaline, 3-acetylpyridazine, 6,6'-diacetyl-2,2'-pyridyl, 3-acetyl-1,2,4-trizol, and combinations thereof.

[Claim 15] (Canceled). A composition according to claim 4, wherein oxime derivatives of hydroxyaryl compositions are selected from 2-hydroxyacetophenone oxime, 2,3-dihydroxyacetophenone oxime, 2,4-dihydroxyacetophenone oxime, 2,5-dihydroxyacetophenone oxime, Resacetophenone oxime, acetyl quinol oxime, Quinacetophenone oxime, Paeonol oxime, 2-hydroxypropiophenone oxime, 2,3-dihydroxypropiophenone oxime , 2,4-dihydroxypropiophenone oxime, 2,5-dihydroxypropiophenone oxime, 7-acetyl-5,8-dihydroxyquinoline oxime, and combinations thereof.

[Claim 16] (Canceled). A composition according to claim 6, wherein hydroxyaryl compound is selected from 1-hydroxy-2-acetylnaphthalene; 1-hydroxy-2-acetyl-5,6,7,8-tetrahydro-naphthalene; 7-acetyl-8-hydroxyquinoline; 3-acetyl-4-hydroxyacridine; 6-acetyl-7-hydroxybenzothiazole, and combinations thereof.

[Claim 17] (Canceled). A compound according to claim 8, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, or combinations thereof, in same ring that contains nitrogen hetero-atom, or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring.

[Claim 18] (Canceled). A composition according to claim 9, wherein cosmetically or pharmaceutically acceptable topical delivery system or carrier base composition additionally contains hydroxy or polyhydroxy flavones, hydroxy or polyhydroxy coumarins, hydroxy or polyhydroxy

isoflavones, hydroxy or polyhydroxy chromanones, and hydroxy or polyhydroxy chromones, and combinations thereof.

[Claim 19] (Canceled). A composition according to claim 9, wherein a cosmetically or pharmaceutically acceptable topical delivery system or carrier base composition additionally contains a divalent or a polyvalent metal ion or combinations thereof.

[Claim 20] (Canceled). A composition according to claim 9, wherein cosmetically or pharmaceutically acceptable delivery system or carrier base can optionally include additional skin beneficial ingredients selected from skin cleansers, surfactants (cationic, anionic, non-ionic, amphoteric, and zwitterionic), skin and hair conditioning agents, vitamins, hormones, minerals, plant extracts, anti-inflammatory agents, concentrates of plant extracts, emollients, moisturizers, skin protectants, humectants, silicones, skin soothing ingredients, analgesics, skin penetration enhancers, solubilizers, moisturizers, emollients, anesthetics, colorants, perfumes, preservatives, seeds, broken seed nut shells, silica, clays, beads, luffa particles, polyethylene balls, mica, pH adjusters, processing aids, and combinations thereof.

[Claim 21] (Canceled). A composition according to claim 19, wherein divalent metal ions are selected from copper, zinc, iron, selenium, vanadium, manganese, and combinations thereof.

[Claim 22] (Canceled). A composition according to claim 20, wherein anti-inflammatory agents are selected from Boswellia serrata, Corosolic acid (Banaba), Ursolic acid, Oleanolic acid, Salicinol (Salacia), Rosmarinic acid, Ruscogenins, Darutoside, Asiaticoside, Sericoside, Harpagoside (Devil's Claw), Magnolia Bark (Honokiol, Magnolol), Horse Chestnut (Escin, Esculin), Ginger (Gingerol), Turmeric Extract (Tetrahydrocurcuminoids), Corydalis, Myricetin, and combinations thereof.

[Claim 23] (Previously Presented). An MMP inhibitor according to claim 1, wherein a carrier base is included.

[Claim 24] (Previously Presented). An MMP inhibitor according to claim 1, wherein a divalent metal ion is included.

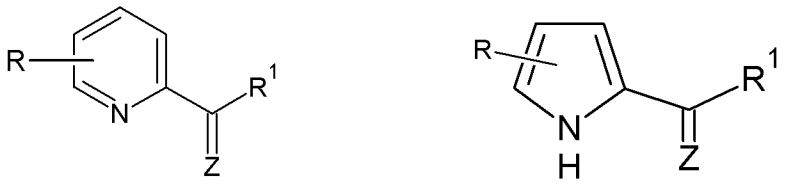
[Claim 25] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound is Resacetophenone.

[Claim 26] (Currently Amended). An MMP inhibitor according to claim 6, wherein hydroxyaryl compound is further selected from the group consisting of 1-hydroxy-2-acetylnaphthalene; 1-hydroxy-2-acetyl-5,6,7,8-tetrahydro-naphthalene; 7-acetyl-8-hydroxyquinoline; 3-acetyl-4-hydroxyacridine; 6-acetyl-7-hydroxybenzothiazole, or combinations thereof.

[Claim 27] (Currently Amended). An MMP inhibitor according to claim 23, wherein a carrier base is selected from the group consisting of water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, and anhydrous compositions.

[Claim 28] (Currently Amended). An MMP inhibitor according to claim 24, wherein divalent metal ion is selected from the group consisting of copper, zinc, iron, selenium, vanadium, and manganese.

[Claim 29] (Currently Amended). A Matrix Metalloprotease, MMP, Inhibitor comprising at least one N-hetero-aromatic compound that contains an alkyl carbon side chain with a ketone group attached at the first carbon atom of the alkyl side chain, and said ketone group is directly attached to the nitrogen hetero-aromatic ring at a position adjacent to the aromatic ring nitrogen atom, the chemical structure of which is in accordance to formula (IV):



(IV)

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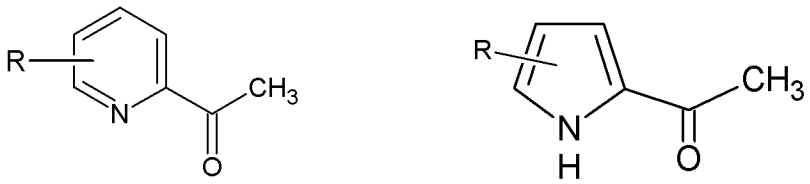
Wherein:
Z is O ;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl; and
R1 is Methyl, Ethyl, Alkyl, and Aryl.

[Claim 30] (Currently Amended). An MMP inhibitor according to claim 29, wherein-hetero-aromatic compound is further selected from 2-acetyl-substituted N-hetero-aromatic compounds, the chemical structure of which is in accordance to formula (V):



(V)

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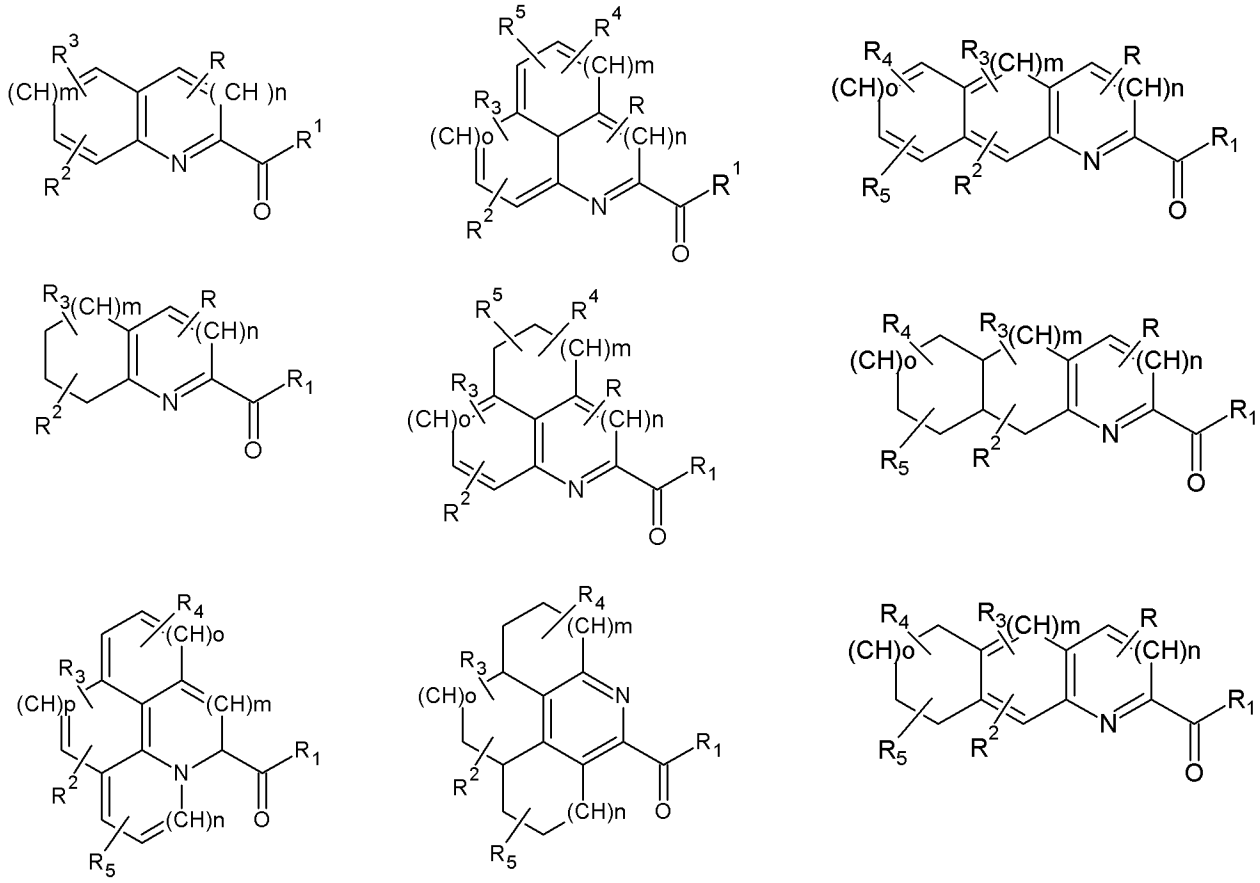
Wherein:
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl.

[Claim 31] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound contains additional cyclic rings attached at the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to formula VI:



(VI)

Wherein:
Z is O ;
R , R1, R2, R3, R4, R5 is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl; and
R1 is Methyl, Ethyl, Alkyl, Aryl;
n = 0, or 1;
m = 0, or 1;
o = 0, or 1; and
p = 0, or 1.

[Claim 32] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, in same ring that contains nitrogen hetero-atom; or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to formula (VII):

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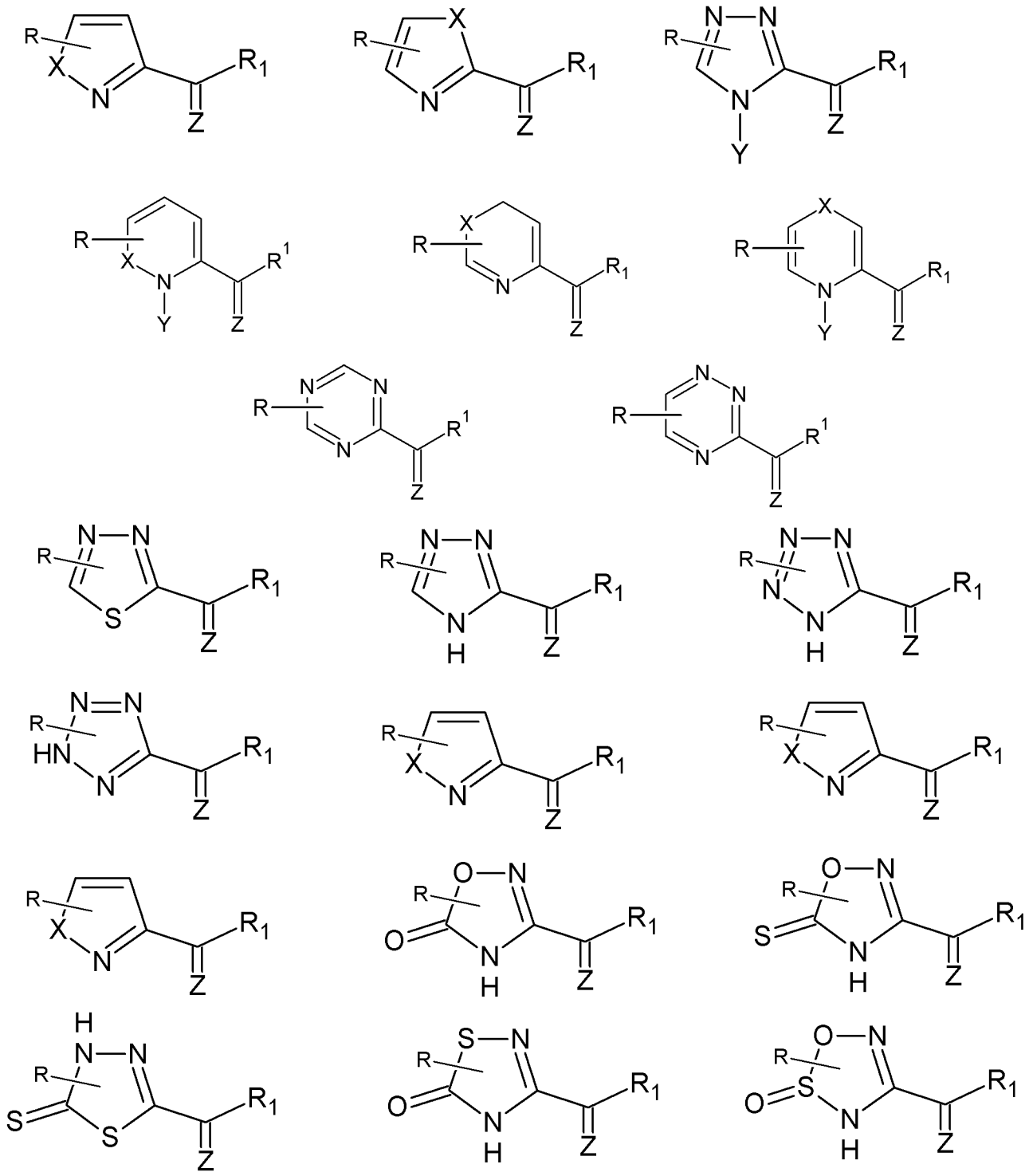


(VII)

Wherein:
Z is O ;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl;

R1 is selected from the group consisting of Methyl, Ethyl, Alkyl, and Aryl;

X is selected from the group consisting of N, O, and S; and

Y is selected from the group consisting of H, Alkyl, Cycloalkyl, and Aryl.

[Claim 33] (Previously Presented). An MMP inhibitor according to claim 29, wherein a carrier base is included.

[Claim 34] (Previously Presented). An MMP inhibitor according to claim 29, wherein a divalent metal ion is included.

[Claim 35] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound is further selected from 2-acetylpyridine, 2-acetylpyrrole, 2-acetylimidazole, 2-acetylthiazole, 2-acetylpyrimidine, 2-acetylindole, 2-acetyl-1-methylpyrrole, 2-acetyl-4-methylpyridine, 1-acetylphenothiazine, 2-hydroxy-1-acetylphenothiazine, 8-hydroxy-9-acetylphenanthrene, 2-acetylpyrazine, 2-acetylquinoline, 2-acetyl-8-hydroxyquinoline, 2-acetyltryptophane, 2-acetyltryptophanamide, 2-acetylpyridine N-oxide, 2-acetylquinazoline, 2-acetylquinoxaline, and 3-acetylpyridazine, 6,6'-diacetyl-2,2'-pyridyl, 3-actyl-1,2,4-trizol.

[Claim 36] (Currently Amended). An MMP inhibitor according to claim 31, wherein N-hetero-aromatic compound is 2-acetyl-8-hydroxyquinoline.

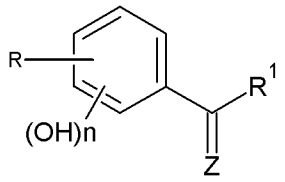
[Claim 37] (Canceled). An MMP inhibitor according to claim 32, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, or combinations thereof, in same ring that contains nitrogen hetero-atom, or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to Figure 7.

[Claim 38] (Currently Amended). An MMP inhibitor according to claim 33, wherein a carrier base is selected from the group consisting of water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, and anhydrous compositions.

[Claim 39] (Previously Presented). An MMP inhibitor according to claim 34, wherein divalent metal ion is selected from copper, zinc, iron, selenium, vanadium, manganese, or combinations thereof.

CLAIMS (Marked Copy)

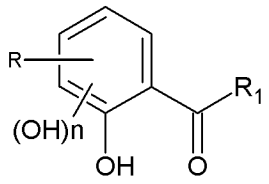
[Claim 1] (Currently Amended). A Matrix Metalloprotease, MMP, Inhibitor ~~comprising~~ consisting of at least one hydroxyaryl compound that contains an alkyl carbon side chain with a ketone group attached at the first carbon atom of the alkyl side chain, and said ketone group is directly attached to the aromatic ring at a position adjacent to hydroxyl group of hydroxyaryl ring, the chemical structure of which is in accordance to ~~Figure 1~~ formula (I):



(I)

Wherein:
Z is O ;
(OH)n is one, two, or three OH substituents, one of which is 2-hydroxy;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl; and
R1 is selected from the group consisting of Methyl, Ethyl, Alkyl, and Aryl.

[Claim 2] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound is selected from the group consisting of hydroxy acetophenones, ~~or~~ and hydroxy propiophenones, the chemical structure of which is in accordance to ~~Figure 2~~ formula (II):



(II)

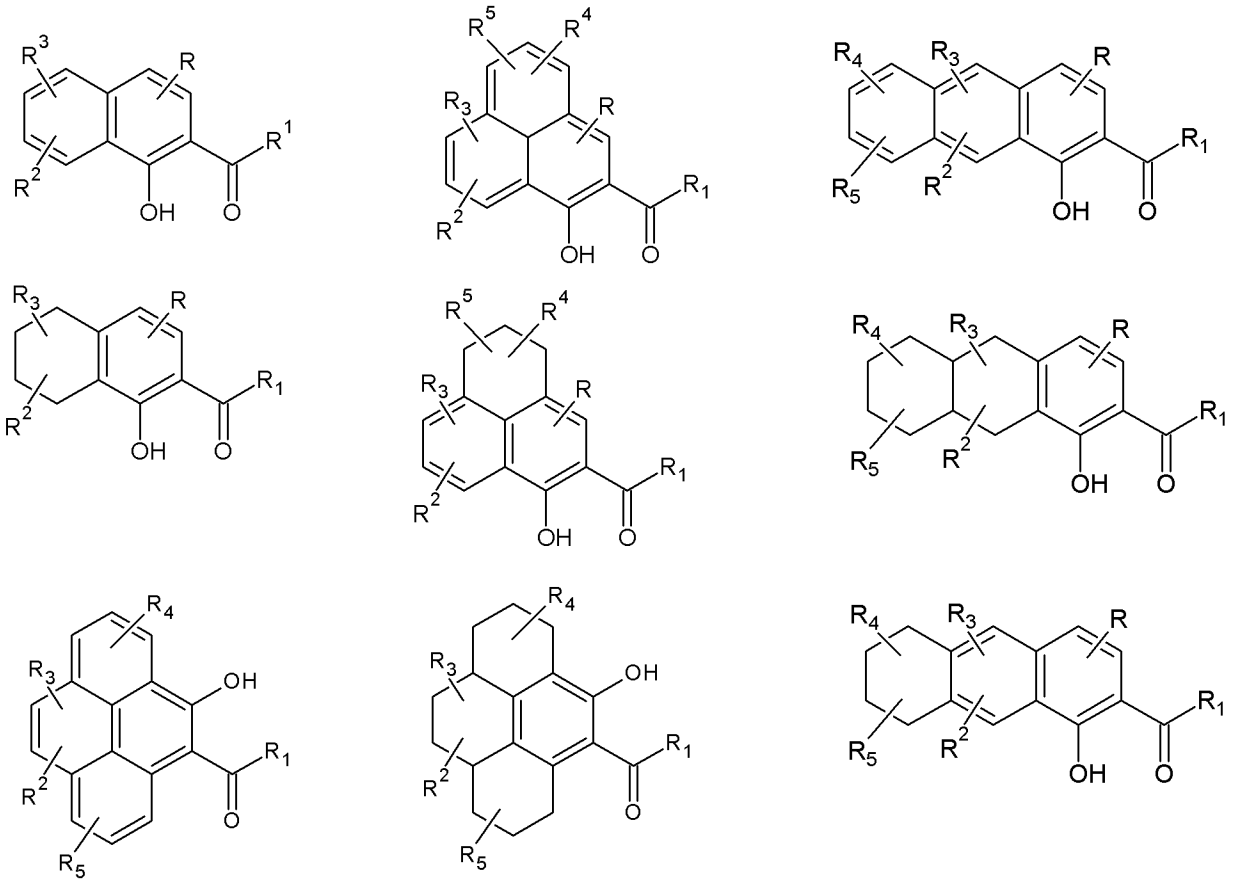
Wherein:
(OH)n is one or two OH substituents;
R1 is Methyl or Ethyl;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl.

[Claim 3] (Canceled). A composition according to claim 1, wherein-hetero-aromatic compound is selected from 2-acetyl-substituted N-hetero-aromatic compounds.

[Claim 4] (Canceled). A composition according to claim 1, wherein hydroxyaryl compound is selected from oxime, or hydrazide, or semicarbazone, or oxamic hydrazone derivatives of hydroxyaryl- or polyhydroxyaryl alkyl ketones.

[Claim 5] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound is selected from oxime, or hydrazide, or semicarbazone, or oxamic hydrazone derivatives of N-hetero-aromatic alkyl ketones.

[Claim 6] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound contains additional cyclic rings attached at the aromatic ring, the chemical structure of which is in accordance to ~~Figure 3~~ formula (III):



(III)

Wherein:

R1 is Methyl or Ethyl;

R2, R3, R4, and R5 are each independently selected from the group consisting of H, OH, Methyl, Alkyl, Cyclo-Alkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, O-Alkyl, and S-Alkyl.

[Claim 7] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound contains additional cyclic rings attached at the nitrogen hetero-aromatic ring.

[Claim 8] (Canceled). A composition according to claim 1, wherein N-hetero-aromatic compound contains additional hetero-atoms in same ring that contains nitrogen hetero-atom; or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring.

[Claim 9] (Canceled). A composition according to claim 1, wherein the cosmetically or pharmaceutically acceptable delivery system can be traditional water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, or anhydrous compositions.

[Claim 10] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxy acetophenone compound is selected from the group consisting of 2-hydroxyacetophenone, 3-hydroxyacetophenone, 4-hydroxyacetophenone, 2,3-dihydroxyacetophenone, ~~2,4-dihydroxyacetophenone~~, 2,5-dihydroxyacetophenone, 2,6-dihydroxyacetophenone, 3,4-dihydroxyacetophenone, 3,5-dihydroxyacetophenone, 2,4,6-trihydroxyacetophenone, 2,3,4-trihydroxyacetophenone, 2,3,5-trihydroxyacetophenone, 2,3,6-trihydroxyacetophenone, 2,4,5-trihydroxyacetophenone, 3,4,5-trihydroxyacetophenone, Resacetophenone, 2-Acetyl resorcinol, 4-Acetyl resorcinol, 3,4-Dihydroxyacetophenone, acetyl quinol, Quinacetophenone, 1-(3-Hydroxy-4-methoxy-5-methylphenyl) ethanone, 1-(3-hydroxy-4-methoxyphenyl) ethanone, Paeonol, Phloridzin, 5'-Bromo-2'-hydroxyacetophenone, 5'-Chloro-2'-hydroxyacetophenone, 3',5'-Dichloro-2'-hydroxyacetophenone, 3',5'-Dibromo-4'-hydroxyacetophenone, and 5-Chloro-3-bromo-2-hydroxyacetophenone, ~~or combinations thereof, the chemical structure of which is in accordance to Figure 1~~.

[Claim 11] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxy propiophenone compound is selected from the group consisting of 2-hydroxypropiophenone, 3-hydroxypropiophenone, 4-hydroxypropiophenone, 2,3-dihydroxypropiophenone, 2,4-dihydroxypropiophenone, 2,5-dihydroxypropiophenone, 2,6-dihydroxypropiophenone, 3,4-dihydroxypropiophenone, 3,5-dihydroxypropiophenone, 2,4,6-trihydroxypropiophenone, 2,3,4-trihydroxypropiophenone, 2,3,5-trihydroxypropiophenone, 2,3,6-trihydroxypropiophenone, 2,4,5-trihydroxypropiophenone, 3,4,5-trihydroxypropiophenone, 1-(2,4-dihydroxyphenyl)-2-hydroxyethanone, (2-hydroxyphenyl)(oxo)acetic acid, 1-(2,6-dihydroxyphenyl)-1-butanone, 1-(1-hydroxy-2-naphthyl)ethanone, 1-(2-hydroxy-1-naphthyl)ethanone, 5,7-dihydroxy-1-indanone, 1-(2-hydroxy-5-methylphenyl)-1,3-butanedione, N-(4-acetyl-3-hydroxyphenyl)acetamide, 4-acetyl-3-hydroxyphenyl acetate, Phloridzin, 1,1′-(4,6-Dihydroxy-1,3-phenylene)bisethanone, 1-(1-hydroxy-2-naphthyl)ethanone, and 2,3-Dihydro-9,10-dihydroxy-1,4-anthracenedione , ~~and combinations thereof, the chemical structure of which is in accordance to Figure 2~~.

[Claim 12] (Canceled). A composition according to claim 2, wherein oxime, or oxime O-alkyl ether, or hydrazone, or semicarbazone, or oxamic hydrazone derivatives of hydroxy or polyhydroxy acetophenones, or hydroxy or polyhydroxy propiophenones, or combinations thereof, are selected.

[Claim 13] (Canceled). A composition according to claim 2, wherein oxime, or oxime O-alkyl ether, or hydrazone, or semicarbazone, or oxamic hydrazone derivatives of 2-acetyl-N-heteroaromatic, or 2-propionyl-N-heteroaromatic compounds, or combinations thereof, are selected.

[Claim 14] (Canceled). A composition according to claim 3, wherein N-hetero-aromatic compound is selected from 2-acetylpyridine, 2-Acetyl-4-methylpyridine, 1-(1-oxido-2-pyridinyl)ethanone, 2,6-Diacetylpyridine, 3-(Dimethylamino)-1-(2-pyridyl)-2-propen-1-one, 1,8-Diazafluoren-9-one, 2-phenyl-1-(2-pyridinyl)ethanone, 3-phenyl-1-(2-pyridinyl)-2-propen-1-one, 1-(2-pyridinyl)-3-(3-pyridinyl)-2-propen-1-one, 2-hydroxy-1,2-di(2-pyridinyl)ethanone, 1-(2-pyridinyl)-3-(2-thienyl)-2-propen-1-one, 3-(2-hydroxyphenyl)-1-(2-pyridinyl)-2-propen-1-one, 3-(1-oxido-2-pyridinyl)-1-(2-pyridinyl)-2-propen-1-one, 2-acetylpyrrole, 2-Acetyl-1-methylpyrrole, 2-chloro-1-(1H-pyrrol-2-yl)ethanone, 2-(Trifluoroacetyl)pyrrole, 1,4-dihydrocyclopenta[b]indol-3(2H)-one, 2,3,4,9-tetrahydro-1H-carbazol-1-one, (2E)-1,3-di(1H-pyrrol-2-yl)-2-propen-1-one, (2E)-3-phenyl-1-(1H-pyrrol-2-yl)-2-propen-1-one, 2-acetylimidazole, 1-(5-methyl-2-phenyl-1H-imidazol-4-yl)ethanone, 1-(5,6-dimethyl-

1H-benzimidazol-2-yl)ethanone, (4-chlorophenyl)(1-methyl-1H-imidazol-2-yl)methanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 1-[1-(4-methylbenzyl)-1H-benzimidazol-2-yl]ethanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(2-fluorophenyl)-2-propen-1-one, (2E)-1-(1H-benzimidazol-2-yl)-3-(2-chlorophenyl)-2-propen-1-one, (2E)-1-(5-chloro-1H-benzimidazol-2-yl)-3-phenyl-2-propen-1-one, 1-[1-(2-chlorobenzyl)-1H-benzimidazol-2-yl]ethanon, (2E)-1-(5,6-dichloro-1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 2-acetylthiazole, 1-(1,3-benzothiazol-2-yl)ethanone, 2-acetylpyrimidine, 2-acetylindole, 2-acetyl-1-methylpyrrole, 2-acetyl-4-methylpyridine, 1-acetylphenothiazine, 2-hydroxy-1-acetylphenothiazine, 8-hydroxy-9-acetylphenanthrene, 2-acetylpyrazine, 1-(3-methyl-2-pyrazinyl)ethanone, 2-acetylquinoline, 2-acetyl-8-hydroxyquinoline, 2-acetyltryptophane, 2-acetyltryptophanamide, 2-acetylpyridine N-oxide, 2-acetylquinazoline, 2-acetylquinoxaline, 3-acetylpyridazine, 6,6'-diacetyl-2,2'-pyridyl, 3-acetyl-1,2,4-trizol, and combinations thereof.

[Claim 15] (Canceled). A composition according to claim 4, wherein oxime derivatives of hydroxyaryl compositions are selected from 2-hydroxyacetophenone oxime, 2,3-dihydroxyacetophenone oxime, 2,4-dihydroxyacetophenone oxime, 2,5-dihydroxyacetophenone oxime, Resacetophenone oxime, acetyl quinol oxime, Quinacetophenone oxime, Paeonol oxime, 2-hydroxypropiophenone oxime, 2,3-dihydroxypropiophenone oxime , 2,4-dihydroxypropiophenone oxime, 2,5-dihydroxypropiophenone oxime, 7-acetyl-5,8-dihydroxyquinoline oxime, and combinations thereof.

[Claim 16] (Canceled). A composition according to claim 6, wherein hydroxyaryl compound is selected from 1-hydroxy-2-acetylnaphthalene; 1-hydroxy-2-acetyl-5,6,7,8-tetrahydro-naphthalene; 7-acetyl-8-hydroxyquinoline; 3-acetyl-4-hydroxyacridine; 6-acetyl-7-hydroxybenzothiazole, and combinations thereof.

[Claim 17] (Canceled). A compound according to claim 8, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, or combinations thereof, in same ring that contains nitrogen hetero-atom, or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring.

[Claim 18] (Canceled). A composition according to claim 9, wherein cosmetically or pharmaceutically acceptable topical delivery system or carrier base composition additionally contains hydroxy or polyhydroxy flavones, hydroxy or polyhydroxy coumarins, hydroxy or polyhydroxy isoflavones, hydroxy or polyhydroxy chromanones, and hydroxy or polyhydroxy chromones, and combinations thereof.

[Claim 19] (Canceled). A composition according to claim 9, wherein a cosmetically or pharmaceutically acceptable topical delivery system or carrier base composition additionally contains a divalent or a polyvalent metal ion or combinations thereof.

[Claim 20] (Canceled). A composition according to claim 9, wherein cosmetically or pharmaceutically acceptable delivery system or carrier base can optionally include additional skin beneficial ingredients selected from skin cleansers, surfactants (cationic, anionic, non-ionic, amphoteric, and zwitterionic), skin and hair conditioning agents, vitamins, hormones, minerals, plant extracts, anti-inflammatory agents, concentrates of plant extracts, emollients, moisturizers, skin protectants, humectants, silicones, skin soothing ingredients, analgesics, skin penetration enhancers, solubilizers, moisturizers, emollients, anesthetics, colorants, perfumes, preservatives, seeds, broken seed nut shells, silica, clays, beads, luffa particles, polyethylene balls, mica, pH adjusters, processing aids, and combinations thereof.

[Claim 21] (Canceled). A composition according to claim 19, wherein divalent metal ions are selected from copper, zinc, iron, selenium, vanadium, manganese, and combinations thereof.

[Claim 22] (Canceled). A composition according to claim 20, wherein anti-inflammatory agents are selected from Boswellia serrata, Corosolic acid (Banaba), Ursolic acid, Oleanolic acid, Salicinol (Salacia), Rosmarinic acid, Ruscogenins, Darutoside, Asiaticoside, Sericoside, Harpagoside (Devil's Claw), Magnolia Bark (Honokiol, Magnolol), Horse Chestnut (Escin, Esculin), Ginger (Gingerol), Turmeric Extract (Tetrahydrocurcuminoids), Corydalis, Myricetin, and combinations thereof.

[Claim 23] (Previously Presented). An MMP inhibitor according to claim 1, wherein a carrier

base is included.

[Claim 24] (Previously Presented). An MMP inhibitor according to claim 1, wherein a divalent metal ion is included.

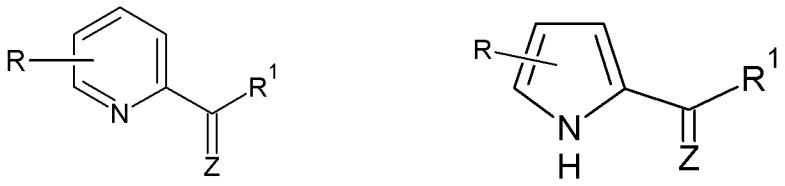
[Claim 25] (Currently Amended). An MMP inhibitor according to claim 1, wherein hydroxyaryl compound is ~~2,4-Dihydroxyacetophenone, having chemical structure in Figure 4.~~ Resacetophenone.

[Claim 26] (Currently Amended). An MMP inhibitor according to claim 6, wherein hydroxyaryl compound is further selected from the group consisting of 1-hydroxy-2-acetylnaphthalene; 1-hydroxy-2-acetyl-5,6,7,8-tetrahydro-naphthalene; 7-acetyl-8-hydroxyquinoline; 3-acetyl-4-hydroxyacridine; 6-acetyl-7-hydroxybenzothiazole, or combinations thereof.

[Claim 27] (Currently Amended). An MMP inhibitor according to claim 23, wherein a carrier base is selected from the group consisting of water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, ~~or~~ and anhydrous compositions.

[Claim 28] (Currently Amended). An MMP inhibitor according to claim 24, wherein divalent metal ion is selected from the group consisting of copper, zinc, iron, selenium, vanadium, and manganese~~, and combinations thereof~~.

[Claim 29] (Currently Amended). A Matrix Metalloprotease, MMP, Inhibitor comprising at least one N-hetero-aromatic compound that contains an alkyl carbon side chain with a ketone group attached at the first carbon atom of the alkyl side chain, and said ketone group is directly attached to the nitrogen hetero-aromatic ring at a position adjacent to the aromatic ring nitrogen atom, the chemical structure of which is in accordance to ~~Figure 5~~ formula (IV):



(IV)

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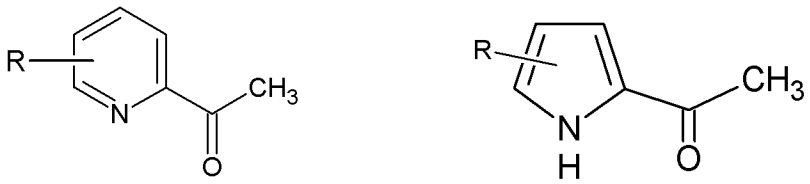
Wherein:
Z is O ;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl; and
R1 is Methyl, Ethyl, Alkyl, and Aryl.

[Claim 30] (Currently Amended). An MMP inhibitor according to claim 29, wherein-hetero-aromatic compound is further selected from 2-acetyl-substituted N-hetero-aromatic compounds, the chemical structure of which is in accordance to ~~Figure 6~~ formula (V):



(V)

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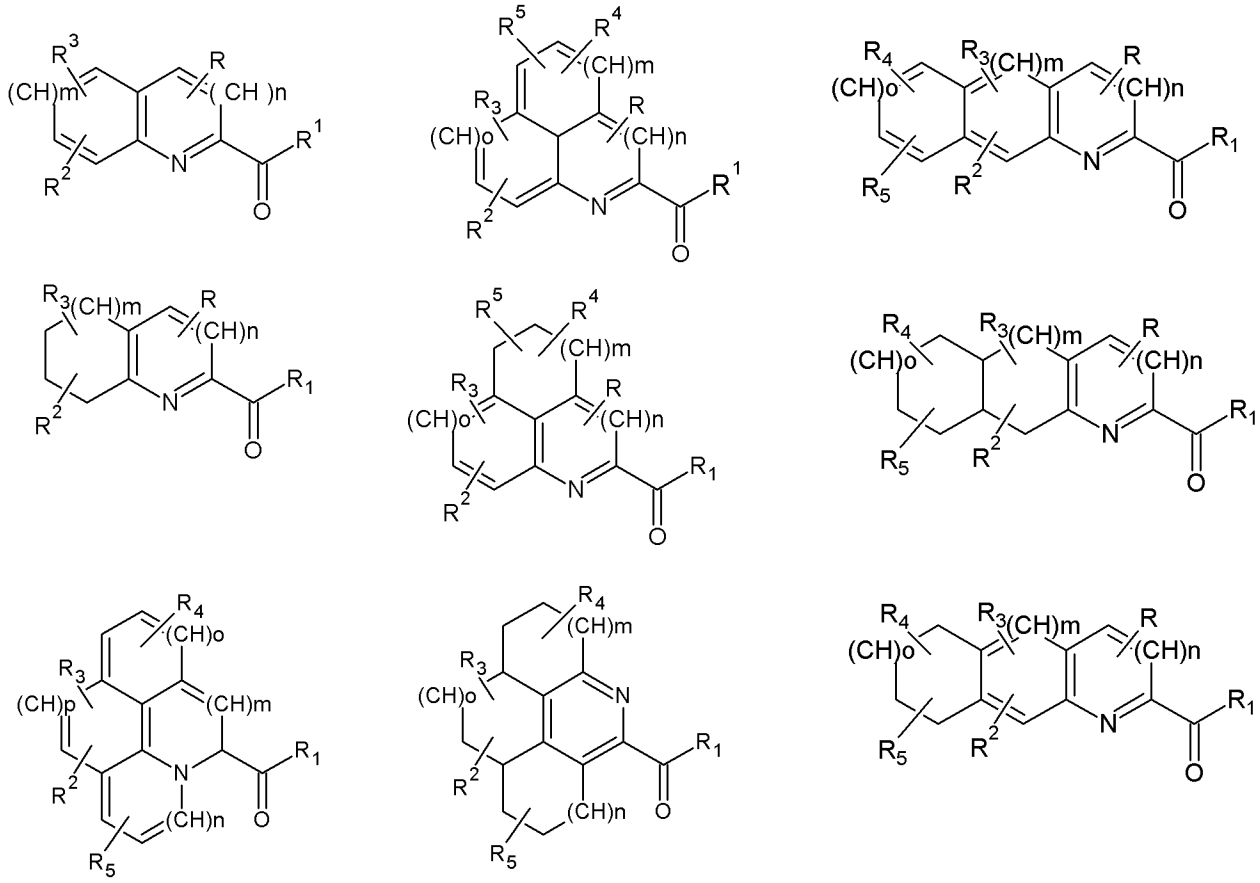
Wherein:
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl.

[Claim 31] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound contains additional cyclic rings attached at the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to ~~Figure 7~~ formula VI:



(VI)

Wherein:
Z is O ;
R , R1, R2, R3, R4, R5 is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl; and
R1 is Methyl, Ethyl, Alkyl, Aryl;
n = 0, or 1;
m = 0, or 1;
o = 0, or 1; and
p = 0, or 1.

[Claim 32] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, in same ring that contains nitrogen hetero-atom; or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to ~~Figure 7~~ formula (VII):

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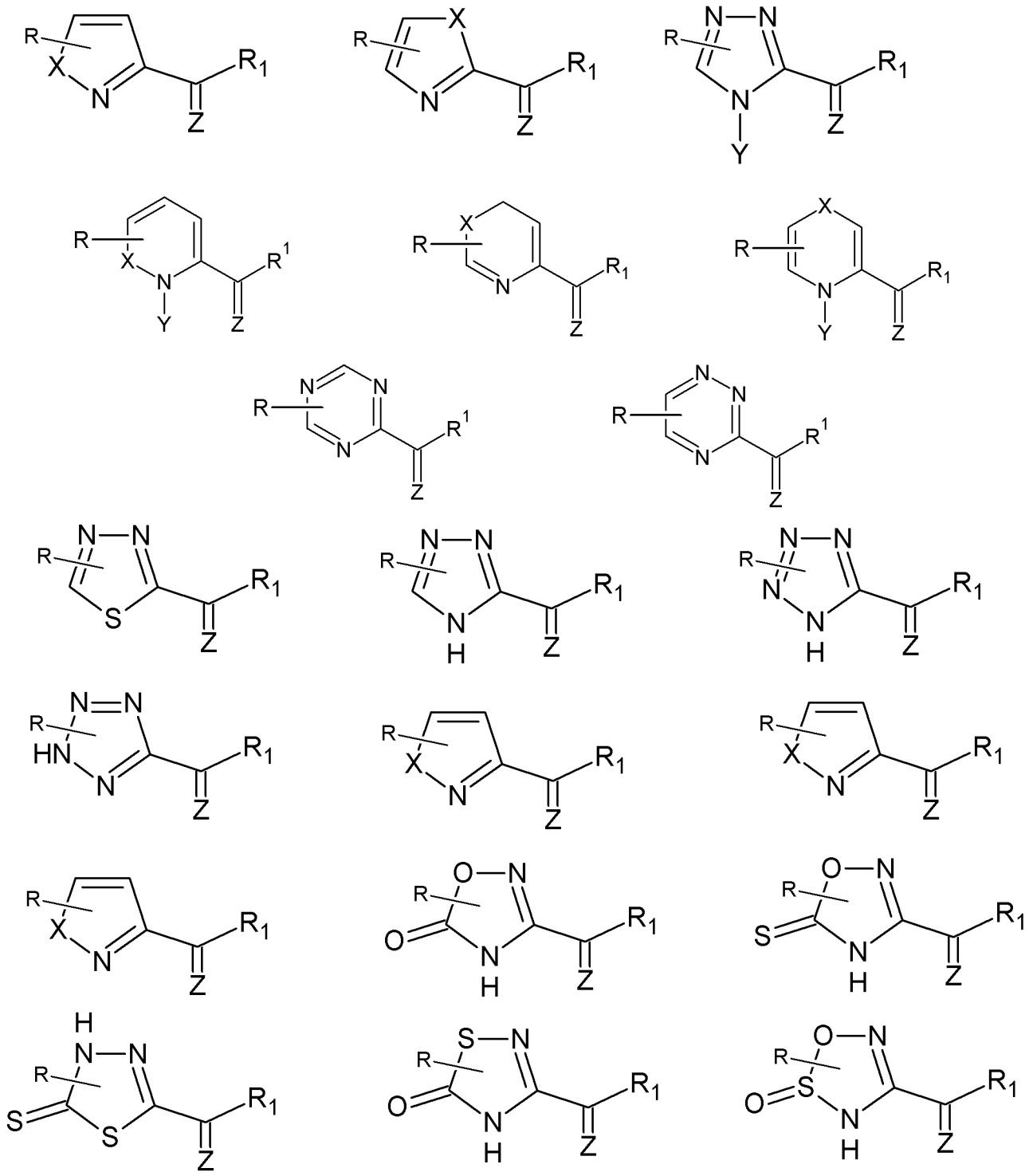

(VII)

Wherein:
Z is O ;
R is one, two, or three substituents each independently selected from the group consisting of Alkyl, Cycloalkyl, Aryl, Cl, Br, NH2, NH-Alkyl, N(Alkyl)2, OH, O-Alkyl, and S-Alkyl;

R1 is selected from the group consisting of Methyl, Ethyl, Alkyl, and Aryl;

X is selected from the group consisting of N, O, and S; and

Y is selected from the group consisting of H, Alkyl, Cycloalkyl, and Aryl.

[Claim 33] (Previously Presented). An MMP inhibitor according to claim 29, wherein a carrier base is included.

[Claim 34] (Previously Presented). An MMP inhibitor according to claim 29, wherein a divalent metal ion is included.

[Claim 35] (Currently Amended). An MMP inhibitor according to claim 29, wherein N-hetero-aromatic compound is further selected from ~~2-acetylpyridine, 2-Acetyl-4-methylpyridine, 1-(1-oxido-2-pyridinyl)ethanone, 2,6-Diacetylpyridine, 3-(Dimethylamino)-1-(2-pyridyl)-2-propen-1-one, 1,8-Diazafluoren-9-one, 2-phenyl-1-(2-pyridinyl)ethanone, 3-phenyl-1-(2-pyridinyl)-2-propen-1-one, 1-(2-pyridinyl)-3-(3-pyridinyl)-2-propen-1-one, 2-hydroxy-1,2-di(2-pyridinyl)ethanone, 1-(2-pyridinyl)-3-(2-thienyl)-2-propen-1-one, 3-(2-hydroxyphenyl)-1-(2-pyridinyl)-2-propen-1-one, 3-(1-oxido-2-pyridinyl)-1-(2-pyridinyl)-2-propen-1-one, 2-acetylpyrrole, 2-Acetyl-1-methylpyrrole, 2-chloro-1-(1H-pyrrol-2-yl)ethanone, 2-(Trifluoroacetyl)pyrrole, 1,4-dihydrocyclopenta[b]indol-3(2H)-one, 2,3,4,9-tetrahydro-1H-carbazol-1-one, (2E)-1,3-di(1H-pyrrol-2-yl)-2-propen-1-one, (2E)-3-phenyl-1-(1H-pyrrol-2-yl)-2-propen-1-one, 2-acetylimidazole, 1-(5-methyl-2-phenyl-1H-imidazol-4-yl) ethanone, 1-(5,6-dimethyl-1H-benzimidazol-2-yl)ethanone, (4-chlorophenyl)(1-methyl-1H-imidazol-2-yl) methanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 1-[1-(4-methylbenzyl)-1H-benzimidazol-2-yl]ethanone, (2E)-1-(1H-benzimidazol-2-yl)-3-(2-fluorophenyl)-2-propen-1-one, (2E)-1-(1H-benzimidazol-2-yl)-3-(2-chlorophenyl)-2-propen-1-one, (2E)-1-(5-chloro-1H-benzimidazol-2-yl)-3-phenyl-2-propen-1-one, 1-[1-(2-chlorobenzyl)-1H-benzimidazol-2-yl] ethanone, (2E)-1-(5,6-dichloro-1H-benzimidazol-2-yl)-3-(4-pyridinyl)-2-propen-1-one, 2-acetylthiazole, 1-(1,3-benzothiazol-2-yl)ethanone, 2-acetylpyrimidine, 2-acetylindole, 2-acetyl-1-methylpyrrole, 2-acetyl-4-methylpyridine, 1-acetylphenothiazine, 2-hydroxy-1-acetylphenothiazine, 8-hydroxy-9-acetylphenanthrene, 2-acetylpyrazine, 1-(3-methyl-2-pyrazinyl)ethanone, 2-acetylquinoline, 2-acetyl-8-hydroxyquinoline, 2-acetyltryptophane, 2-acetyltryptophanamide, 2-acetylpyridine N-oxide, 2-acetylquinazoline, 2-acetylquinoxaline, 3-acetylpyridazine, 6,6'-diacetyl-2,2'-pyridyl, 3-acetyl-1,2,4-triazol, or combinations thereof, the chemical structure of which is in accordance to Figure 6 and Figure 7~~ 2-acetylpyridine, 2-acetylpyrrole, 2-acetylimidazole, 2-acetylthiazole, 2-acetylpyrimidine, 2-acetylindole, 2-acetyl-1-methylpyrrole, 2-acetyl-4-methylpyridine, 1-acetylphenothiazine, 2-hydroxy-1-acetylphenothiazine, 8-

hydroxy-9-acetylphenanthrene, 2-acetylpyrazine, 2-acetylquinoline, 2-acetyl-8-hydroxyquinoline, 2-acetyltryptophane, 2-acetyltryptophanamide, 2-acetylpyridine N-oxide, 2-acetylquinazoline, 2-acetylquinoxaline, and 3-acetylpyridazine, 6,6'-diacetyl-2,2'-pyridyl, 3-actyl-1,2,4-trizol.

[Claim 36] (Currently Amended). An MMP inhibitor according to claim 31, wherein N-hetero-aromatic compound is 2-acetyl-8-hydroxyquinoline~~, having chemical structure according to Figure 4~~.

[Claim 37] (Canceled). An MMP inhibitor according to claim 32, wherein N-hetero-aromatic compound contains additional hetero-atoms that are selected from N, S, or O, or combinations thereof, in same ring that contains nitrogen hetero-atom, or in other cyclic ring or rings that are attached to the nitrogen hetero-aromatic ring, the chemical structure of which is in accordance to Figure 7.

[Claim 38] (Currently Amended). An MMP inhibitor according to claim 33, wherein a carrier base is selected from the group consisting of water and oil emulsions, suspensions, colloids, microemulsions, clear solutions, suspensions of nanoparticles, emulsions of nanoparticles, powders, ~~or~~ and anhydrous compositions.

[Claim 39] (Previously Presented). An MMP inhibitor according to claim 34, wherein divalent metal ion is selected from copper, zinc, iron, selenium, vanadium, manganese, or combinations thereof.